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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

IN THIS ISSUE

Bowen S. Crandall summarizes his observations on the spread of persimmon wilt in southern States, page 158.

Incidence of diseases on vegetable crops in western Oregon in 1942 is reported by Frank P. McWhorter, P. W. Miller, and C. E. Owens, J.A.Milbrath, page 160.

Soil-borne is more important than seed-borne inoculum in infection of eggplant by Phomopsis vexans, according to tests at the Virginia Truck Experiment Station reported by Richard P. Porter, page 167.

Control of certain fungous diseases by spraying, using Fermate and Spergon, is reported by John T. Middleton, page 169.

Thiosan and Tuads gave good protection of most of the seed types used, whereas effectiveness of Spergon varied, depending on the kind of seed, according to results of tests with vegetable seeds reported by B. H. Davis and C. M. Haenseler, page 170.

In brief notes, page 174, H. W. Anderson reports on maturity of apple scab fungus spores in Illinois, and J. G. Gaines and E. E. Clayton state that downy mildew and cold have caused scarcity of tobacco plants in Georgia.

Check List Revision, by Freeman Weiss, page 175.

March weather, page 184.

SPREAD OF PERSIMMON WILT

Bowen S. Crandall

Between 1937 and 1939, in connection with research work on persimmon wilt, observations were made in the southern States, which indicated that the disease was slowly spreading northward in the Carolinas but not in Tennessee[1,2]. Since 1939 only a few days a year have been available for this type of work. During the past summer, while travelling through the area, only one opportunity presented itself for partial observations. The results of this limited survey during 1940, 1941, and 1942, in North Carolina, are presented in Figure 1. Through June 1941 scouting on the same limited scale failed to show any spread northward from the Tennessee area, although the disease apparently continues within this area on the same level of intensity.

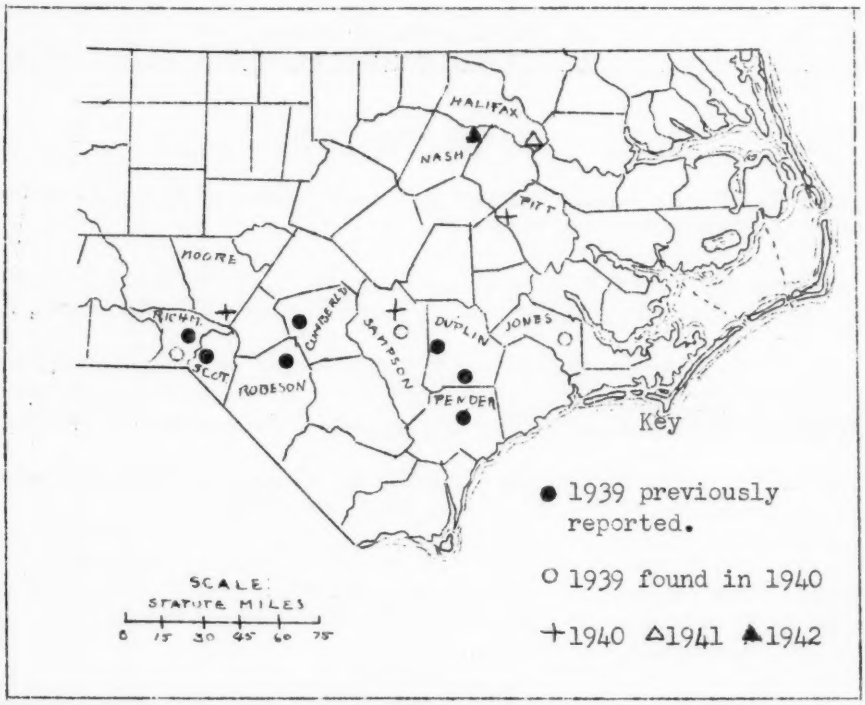

Figure 1. Known locations of persimmon wilt infections in North Carolina

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1 Crandall, Bowen S. Cephalosporium wilt of persimmon in the southeast. Plant Dis. Reporter 23: 56-58. Mar. 1, 1939.

2 _____. Known range of persimmon wilt in 1939. Plant Dis. Reporter 24: 168-169. May 15, 1940.

Early in 1938 plots containing healthy persimmon and others killed by the wilt during the preceding year were mapped in detail to furnish information on the local spread of the pathogen. On some of the areas the disease failed to reappear but showed up in adjacent areas. In other plots the persimmon population was completely wiped out. In only 2 plots did the disease continue a progressive spread through the mapped area. Such inconclusive results served only to demonstrate the destructiveness of the disease.

Table 1. 1942 Resurvey of wilt areas[a] in highway strips

County & State	Miles in strip	Number wilt areas		1938 wilt areas still persisting
		1938	1942	
Leon Co., Fla.	10.9	3	6	1
Wakula Co., Fla.	18.4	6	13	4
Marion Co., Fla.	24.5	7	3	0
Levy Co., Fla.	26.5	3	5	1
Gilchrist Co., Fla.	20.5	6	10	3
Lafayette Co., Fla.	50.6	22	24	8
North central Fla. total	151.4	47	61	17
Gadsden Co., Fla.	16.8	4	5	1
Jackson Co., Fla.	31.4	7	4	1
Washington Co., Fla.	10.6	2	2	1
Holmes Co., Fla.	18.3	6	2	0
Walton Co., Fla.	22.1	7	2	3
Okaloosa Co., Fla.	10.7	8	1	1
Santa Rosa Co., Fla.	29.1	8	7	4
West Florida total	139.0	42	23	11
Glyn Co., Ga.	1	3	3	3
Aiken Co., S. C.	58.5	6	9[b]	0
Barnwell Co., S. C.	9.7	0	2	0
Allendale Co,, S. C.	28.6	1	0	0
Hampton Co., S. C.	16.0	3	0	0
Orangeburg Co., S. C.	28.0	1	7[b]	0

[a] A wilt area consists of dead, dying, and infected trees forming a definite group.

[b] In part a parallel road not included in original strip.

Because of this random way in which the disease made its appearance, strips along the highways were mapped in all the southeastern States. Locations of wilt outbreaks were indicated, with the number of healthy and

diseased trees at each point, but individual trees in each strip were not mapped. Eventually it may be possible to revisit most of the strips, but this can not be done at the present time. During the past summer observations were made on persimmons along some 500 miles of highway in Florida and South Carolina. The changes that have occurred after a lapse of 4 years are summarized in Table 1.

The limited survey data available indicate that, during the time the disease has been under observation, the pathogen has spread into territory in the Carolinas where it was not previously known. Within its range it has persisted, increasing in regions where the host is abundant (north central Florida), and decreasing where the host is scarce (western Florida and South Carolina).

Persimmon wilt may be recognized in early summer by sudden wilting of the leaves, followed by defoliation. These external symptoms are accompanied internally by fine brownish-black streaks in the wood. In the late summer and fall large quantities of salmon-pink spores of the causal fungus are produced between bark and wood. Owing to the limitation of travel, no further scouting can be done at present. We will appreciate reports from anyone observing this disease.

(DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, U. S. DEPARTMENT OF AGRICULTURE, ATHENS, GEORGIA.)

DISEASES OF VEGETABLES IN WESTERN OREGON IN 1942

Frank P. McWhorter, P. W. Miller, C. E. Owens, and J. A. Milbrath

SNAP BEAN.--Rust, Uromyces phaseoli typica, was the most prevalent and widely distributed disease of string beans in Western Oregon in 1942. In the older planting areas, such as Lane County, it is fast becoming a limiting factor in the production of beans, and was exceptionally severe in 1942. During June, pycnia and aecia were abundant in some fields in Lane County. This occurrence was the first authentic record we have of these stages on beans in the State. Later in the season, teliospores were dominant; relatively few urediospores were formed. Many growers applied sulphur dust for control. Opinion among the growers is divided as to whether or not this dusting did any good.

Bean virus 1 was comparatively rare. One severe outbreak occurred in Multnomah County on the Black Valentine variety. In this particular instance the grower saved his own seed. Transmission in the seed is indicated. The virus was present in but did little damage to Burtner's curly-top-resistant variety[1] in some of the local Victory Gardens.

Bean virus 2 was very destructive to plants of the Blue Lake variety in the few instances when it did occur. Observations made during the

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[1] Notes on curly top are not included in this report since a separate report on curly top will be issued by B. F. Dana.

past 3 years indicate that economic damage from this virus is frequently traceable to planting beans near certain legume cover crops that serve as reservoirs. Under Western Oregon conditions red clover and crimson clover seem to be the more frequent sources for severe outbreaks of bean virus 2.

Jenkins' blight (virus), a disease characterized by a severe necrosis of the stem and lower leaves, affected small plants of Blue Lake beans in one small area in Marion County. Two replantings were made in the affected area. Practically all the plants died with a similar severe necrosis. Neither cultures nor microscopic examinations revealed any probable causal organism. The symptoms correspond very closely with a disease that B. F. Dana has had under observation for some time and has diagnosed as "Jenkins' blight" (described by W. A. Jenkins, as "A new Virus Disease of Snap Beans", Journ. Agr. Res. 60: 279-288, 1940).

Bacterial blights. There was little economic loss from bacterial leaf spots in Western Oregon in 1942. One affected field in Multnomah County and a few localized areas in Lane County were recorded. One severe outbreak occurred in a home garden in Umatilla County. The causal organisms have not been cultured and typed, but the dominant symptoms indicate halo-blight [Pseudomonas medicaginis var. phaseolicola].

LIMA BEAN.--Large fields of Lima beans grown for cold pack purposes in Washington County were free, so far as could be detected, from diseases of all kinds.

COMMON BEET.--Leaf spot, Cercospora beticola, was the most abundant and destructive disease of common beet in Western Oregon in 1942. It was widely distributed, occurring in all trucking areas except those in Josephine County. It was particularly serious in Lane and Linn Counties. Incidence was greatest in fields irrigated by the overhead system. It is noteworthy that this disease was exceedingly abundant on selections of Detroit Dark Red resistant to downy mildew.

Leaf blight, Ramularia beticola, was common only in trucking areas in Lincoln County adjacent to the Oregon coast. It caused comparatively little economic damage.

Stalk blight, Phoma sp., occurred occasionally on the leaves and stalks of common beet in Lane, Linn, and Lincoln Counties. It apparently was of no economic importance on table beets in 1942. However, this or a closely related species of Phoma caused very serious economic damage in the Willamette Valley to sugar beets overwintered for seed purposes.

Downy mildew, Peronospora schachtii. Only a trace of this disease was found in Western Oregon. In part, this may be due to the fact that mildew-resistant strains of the Detroit Dark Red were grown in larger amounts than in previous years.

Heat canker, non-parasitic. A disorder due to heat, causing the petioles of the outer leaves to blacken and fall over, was found prevalent in beet plantings in Western Oregon. This physiological disease was particularly abundant in Multnomah and Lane Counties in non-irrigated plantings.

BROCCOLI.--Black leaf spot, Macrosporium herculeum [Alternaria brassicae (Berk.) Bolle, not Sacc.]. Traces were observed in Lane County.

Downy mildew, Peronospora parasitica, was found in limited amounts after the middle of August in several plantings in Lincoln and Lane Counties.

Ring spot, Mycosphaerella brassicicola. Traces of this disease were found in truck plantings in Lincoln County adjacent to the Oregon coast.

CABBAGE.--Downy mildew, Peronospora parasitica, was widely distributed in Western Oregon in 1942. It caused some economic damage in fall plantings in Lincoln and Coos Counties but did only little damage in earlier plantings in Benton and Lane Counties.

Ring spot, Mycosphaerella brassicicola. A very extensive survey of the occurrence of this disease in practically all areas in Western Oregon was made in connection with the potential development of cabbage seed production in the State. It was found in only 3 fields. One of these was on the Columbia highway in Multnomah County and the other 2 in an old truck farm on the coast in Lincoln County.

Black leaf spot, Macrosporium herculeum [Alternaria brassicae (Berk.) Bolle, not Sacc.]. Traces were found in Benton County in a small planting being grown for seed purposes. The lesions were of the small spot type and bore conidia typical of Macrosporium herculeum.

Club root, Plasmodiophora brassicae. A few fields were observed where this disease has become thoroughly established in the soil. The most severe infection was in Multnomah County; the others were in Lincoln County. Cauliflower and kale in these fields were also infected.

Black leg, Phoma lingam. A careful survey of the most important cabbage-growing sections in Western Oregon failed to disclose a single case of this disease.

CARROT.--Leaf blight, Cercospora apii var. carotae [C. carotae], was very prevalent and destructive in certain fields in Lane County where overhead irrigation was practiced. It was also found in Washington County but was less prevalent there and did much less damage.

Yellows, western aster yellows virus, was prevalent in truck plantings in the Willamette Valley. Economic losses were important only in those fields where the plants were infected when small. A study is planned to determine the local circumstances and alternate hosts relating to distribution and incidence of infection.

Leaf spot, Macrosporium sp. (?) A leaf spot differing from the Cercospora type was found on a few plants in one garden in Coos County. Cultures indicate that a Macrosporium may be associated.

CELERY.--Late blight, Septoria sp., has been the most important celery disease in Western Oregon for several years. It was again prevalent in 1942. Timely and thorough spraying with cuprous oxide sprays gave good control in some fields this season.

Celery yellows, western aster yellows virus, was present in Lane, Lincoln, and Marion Counties. It was especially destructive in certain old trucking areas in Lane County. In general, however, the disease was less prevalent than in previous years. This may be due in part to the

removal of aster from home gardens in the immediate vicinity of celery fields for the protection of the 1942 crop. Observations made in 1941 indicated that there was a direct correlation between aster plantings and the incidence of infection in celery plantings.

Spotted wilt, tomato spotted-wilt virus. One plant infected with spotted wilt, as determined by subsequent inoculation tests, was found in a field in Marion County.

CHINESE LETTUCE.--Downy mildew, Bremia lactucae. A small amount of this disease was found in one planting in Lane County.

EGGPLANT.--Ascochyta blight, Ascochyta lycopersici, was found in Curry and Linn Counties. The lesions on the foliage of eggplant are conspicuous, slightly-ringed and slate colored. The disease only occasionally attacks the fruit. A careful study of the causal organism disclosed that it is Ascochyta lycopersici, described by C. O. Smith in New Jersey in 1904. (See tomato below). The common eggplant blight due to Phomopsis vexans was not found in Oregon.

Wilt, cause not definitely known. A wilt which has certain characteristics of Verticillium wilt was of minor importance in Lane and Linn Counties. Further investigation is necessary before the true cause is known.

GARLIC.--Mottle, virus (?), is present in all of the commercial garlic plantings in Western Oregon. In the Mexican type, the disease occurs typically as an indistinct mottle. In the Spanish type, some of the affected plants have almost no detectable symptoms while in others the disease occurs in the form of yellow stripes. Typical specimens are being studied by us and by Dr. Philip Brierley.

LETTUCE.--Downy mildew, Bremia lactucae, was prevalent in Lane County, particularly in fields where overhead irrigation is practiced. Under such conditions it caused considerable economic loss, especially since it provides a situation favorable for the development of secondary Botrytis infection.

MUSTARD.--No evidence of any disease was found in large-scale plantings of mustard grown for seed purposes in Benton and Linn Counties.

ONION.--Downy mildew, Peronospora destructor, was the most prevalent and widely distributed disease of both seed and field -crop onions in Western Oregon in 1942. It caused severe economic loss. Truck growers consider this to be the most important problem, by far, with which they have to contend. Nevertheless, they have not as a group provided themselves with large-scale spray equipment so that effective spraying can be attempted.

Yellow dwarf, onion virus 1, has been present in seed onions for about 4 years. It remained a seed onion problem until 1941. Then it spread to several thousand acres of field onions, variety Yellow Danvers, growing on muck land in Marion County. Seedlings attacked when small became an

almost total loss. Those attacked later matured onions but the yield and quality was greatly affected. The infection for the area was estimated at approximately 90% in 1941. During the fall of 1941 control areas were set up and seed onions were removed from the field onions (grown from seed) so that no seed onions were nearer than a mile from those areas. Also, an attempt was made to destroy all the rogues in the muck land fields and former seed onion fields and to remove the debris from cleaning sheds adjacent to the fields. This procedure was necessary since the winters in Marion County permit the overwintering of bulbs lying on the surface of the soil. It had been shown in Iowa (by Henderson et al) that the disease is not seed-borne. Greenhouse tests by us, using seeds from yellow-dwarf diseased onions, confirmed this conclusion. This circumstance permitted the isolation measures to succeed beyond expectations. Random sample counts made at intervals in the muck land plantings showed that the disease had been reduced from approximately 90% in 1941 to less than 0.1% in 1942 and that most of the area seemed entirely free from the disease.

Smut, Urocystis cepulae. Local records of this disease in Oregon muck land plantings date back to 1916. Professor H. P. Barss introduced the formaldehyde-drip method of control in 1918. The fungus is still abundant in the muck land but no serious losses have been observed in recent years where the formaldehyde-drip control is practiced.

Neck rot, Botrytis sp. One outbreak of commercial importance was observed in Lane County in 1942. No other reports of its occurrence in the State were received.

PARSNIP.--Yellows, western aster yellows virus, was very abundant on parsnips grown for seed purposes in Western Oregon in 1941 and 1942. Infected plants are noticeably yellowed and when mature average about one-third shorter than healthy plants. Yellows does not prevent them from producing seed. Initial infection takes place in the late summer or fall. Overwintered infected plants serve as reservoirs for the virus and may constitute an important source of infection for other susceptible truck crops.

Leaf spot, Ramularia pastinacae, was abundant in Marion County plantings in 1941. In 1942, however, only a trace of the disease was observed in Marion and Benton Counties. This is the only fungous disease known to occur regularly on parsnips in Western Oregon fields. It has never, however, been sufficiently damaging to cause the growers to ask for control measures.

PEA.--Downy mildew, Peronospora viciae. The economic importance of this disease in Oregon plantings depends on the location with reference to the proximity to the ocean. Prior to 1938, when green-pack peas, grown on strings or netting, were the chief commercial product, downy mildew was the most important disease. These crops were grown chiefly in Clatsop County. Surveys and trial plantings showed that economic losses were likely to occur as far as 50 miles inland along the Columbia River and 15 miles inland in other northern counties bordering along the ocean. Downy mildew was the limiting factor for green-pack cultures in this coast zone where other conditions were very favorable to the crop, and was

directly responsible for the decline of these plantings. Only a few acres now remain. Control by spraying has proved impracticable since the economic damage results from injury to pods which are infected initially in the partly closed flower parts. Pod infection is entirely out of proportion to foliage infection which can be relatively easily controlled. The only practicable means of control seems to be the development of resistant varieties. This disease is of no economic importance except in coastal plantings, and it occurred in these again in 1942.

Mosaic, pea virus 1, was the dominant virus on peas in Oregon in 1942. It was economically important this year for the first time in Eastern Oregon pea fields which total some 55,000 acres. The damage done was proportionate to infestation by the pea aphid, Macrosiphum pisi.

Root rots. Oregon plantings were comparatively free from root rots again in 1942. Surveys made every year during the past 5 have shown that root rots are as yet of no economic importance in the large acreages of Umatilla County, although seed treatments are seldom practiced. Field peas around Bend and Klamath Falls, especially in plantings made in cold wet soil, have developed serious root rot in some years. An examination of specimens of these in 1942 indicates that Aphanomyces entiches is a chief causal organism. No serious losses were observed on garden peas in Western Oregon this year and most of those that were seen involved an Ascochyta history related to planting peas after peas. Root rots and wilts of the Fusarium type were not observed by us or reported to us during 1942.

Spotted wilt, tomato spotted-wilt virus. In Coos County, peas growing close to tomatoes showing both spotted wilt and tip blight symptoms developed symptoms similar to those described for spotted wilt on peas.

PEPPER.--Tobacco mosaic, tobacco virus 1. One truck planting in Lane County was severely damaged by a yellow-mosaic strain of tobacco virus 1. Transfers to test plants and microscopic examination of both the pepper and the test plants proved the virus determination. Most of the pepper plants showing typical infections were so severely damaged that no fruit was produced.

POTATO.--Late blight, Phytophthora infestans. During the season of 1942 late blight was prevalent in a considerable portion of Oregon west of the Cascade Mountains, particularly in the Willamette Valley and in those counties bordering on the Coast and the lower Columbia River. The disease appeared earlier than it does in an average year, the first reports coming in early in June. During the dry midsummer weeks the spread of the disease was checked, particularly in the upper Willamette Valley; but during the later summer and early fall it increased in severity, especially along the Coast and the Columbia River where moister conditions prevailed. Yields were considerably reduced in some localities.

Ring rot, Corynebacterium sepedonicum, occurred in small amounts in scattered localities but losses in 1942 were not large. In the large potato-growing area of Klamath County, ring rot was less severe than for the previous 2 years. Such losses as occurred resulted for the most part from a few cases where certification of lots grown for seed was refused

because of the presence of a small amount of ring rot.

Blackleg, Erwinia phytophthora. In 1942 there was about the average amount of blackleg. It occurs in small amounts in many localities over the State, both east and west of the Cascade Mountains.

Virus diseases. Miscellaneous virus diseases, including rugose mosaic, mild mosaic, and leaf roll were encountered in the usual small amounts in the potato-growing areas. Occasionally cases of calico, witches' broom and giant hill occurred.

Fusarium rots. Miscellaneous Fusarium rots were encountered in lots of potatoes sent in for ring rot diagnosis from Klamath County and Willamette Valley.

SPINACH.--Downy mildew, Peronospora effusa, disease was found in a number of fields of spinach grown for seed purposes in Benton County. However, in only an occasional field was the disease severe enough to cause economic damage.

Heterosporium blight, Heterosporium sp. A careful search for the presence of this disease in a number of fields being grown for seed in Benton and Linn Counties failed to disclose a single case of Heterosporium blight.

TOMATO.--Tip blight, virus, was more prevalent in southern Oregon in both 1941 and 1942 than for several years previously. Strains of the Indiana Canner variety selected for resistance showed less resistance in 1941 and 1942 than formerly.

Spotted wilt, virus, was not so prevalent, on the whole, in 1942 as in 1941. Minor outbreaks of spotted wilt occurred in Lane, Linn and Curry Counties and one severe outbreak was observed in Coos County in a locality where it was known to have been present since 1936. Studies made during the past 3 years have shown that spotted wilt outbreaks in Oregon are closely correlated with the presence of infected dahlias growing in the immediate vicinity of tomato fields. The same correlation was observed during 1942.

Late blight, Phytophthora infestans, did much less damage to the tomato crop in 1942 than it did in 1941. This was due to dry weather in September and October, 1942. The greatest loss in both years was from fruit rot caused by P. infestans. This infection is different from the Phytophthora ring-rots reported in California and certain other States. Isolates from 6 different collections in Oregon were compared with pure cultures of P. cryptogea, P. drechsleri, and P. parasitica, kindly sent to us by Dr. Tompkins from the University of California. Studies of these cultures and of comparable cross inoculations show that the rotting of tomato fruit in Western Oregon is due to P. infestans. The purplish or slate-colored areas on the fruit, while plainly discernible, are not strongly ringed as is frequently the case when species other than infestans are responsible. We have some evidence this season that the infection of tomato plants is greatest in home gardens where the tomatoes are grown close to potato plants.

Early blight, Macrosporium [Alternaria] solani. We have no authentic record of this disease in Oregon until 1941. In that year a severe outbreak occurred in one isolated truck farm in Lane County. The grower,

Mr. Leo Stump, who is an exceptionally close observer, stated that the disease was present as early as 1939. In 1941 it practically ruined his crop, being present in all stages, -- black leg, leaf spot, and finally fruit drop. The fruit drop symptoms corresponded exactly with those characteristic of this disease in Westmoreland County, Virginia, where these symptoms were first described. A careful soil sterilization program combined with seed treatment and selection of disease-free stock greatly reduced the disease in 1942. This year, the grower observed a similar foliage blight on the weed Solanum nigrum. Microscopic examination proved the presence of M. solani on the weed, which indicates that this plant may have had some part in the establishment of the fungus in that location.

Ascochyta lycopersici was collected on tomato plants in a home garden in Curry County. This occurrence has economic significance since the garden concerned was the demonstration plot of the county agent who is trying to introduce tomato culture into that section as part of the Victory Garden program. The county agent, Mr. Knox, called the disease to our attention because he considered it to be a possible limiting factor in the development of garden plantings in his locality. The symptoms superficially resembled those of early blight.

(COOPERATIVE INVESTIGATIONS BETWEEN THE OREGON AGRICULTURAL EXPERIMENT STATION AND THE DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, U. S. DEPARTMENT OF AGRICULTURE).

SEED-BORNE INOCCULUM OF PHOMOPSIS VEXANS - ITS EXTENT AND EFFECTS

Richard P. Porter

Sherbakoff (4), Edgerton and Moreland (1), and Palo (3) have shown that the eggplant Phomopsis blight organism (Phomopsis vexans Harter) may be seed-borne. To determine the extent of its presence in eggplant seed lots, the author studied 27 seed samples of 12 varieties. Twenty-five of these samples were obtained from 15 American seed companies, 1 sample came from Japan, and 1 was home-extracted seed. Seeds from each lot were first examined under a low-power microscope for pycnidia, either on the seed or on debris with the seed. All suspected material then was examined further under a higher powered microscope, and if Phomopsis spores were found, the lot was considered to be contaminated. Six of the 27 seed lots examined, or 22%, showed Phomopsis spores to be present. Of these 6, stylospores appeared alone in 3 lots, and pycnospores and stylospores together were found in 3 lots (Table 1). It is interesting to note that of the 12 different varieties represented in this examination, only the variety Black Beauty showed the presence of spores with the seed.

One gram of the contaminated seed was soaked in 2 cc. of sterile water for 2 to 3 hours, then one drop of the suspension thus obtained was placed in a Petri dish and melted acidified potato-dextrose agar added and allowed

Table 1. Spore type of Phomopsis vexans found with eggplant seed lots, and results of attempts to isolate the organism from infested seed lots

Lot number	Isolation of Phomopsis vexans	Spore type
17	No	Stylospores
24	No	Stylospores
25	Yes	Stylospores and pycnospores, stylospores more numerous
27	No	Stylospores
28	Yes	Stylospores and pycnospores, stylospores more numerous
26	Yes	Stylospores and pycnospores, pycnospores more numerous

to solidify. All platings from the lots containing pycnospores yielded growth of Phomopsis vexans while those containing only stylospores did not (Table 1). Other authors (1, 2, 4) have noted that stylospores are not easily germinated on culture media.

Since inoculum of Phomopsis vexans appeared in 22% of the seed lots examined, it was of interest to compare the amount of reduction in stand caused by planting seed artificially contaminated with the organism, with that resulting from artificially contaminated soil. Two tests of 500 seeds each, planted at different dates, showed that contaminated seed planted in sterile soil reduced the mean stand 10.7%, contaminated seed in contaminated soil reduced the mean stand 22.5%, and disease-free seed planted in contaminated soil reduced the mean stand 19.8%, from that obtained when disease-free seed was planted in sterile soil (Table 2). Contaminated soil is apparently more important in reduction of stand than is contaminated seed.

Table 2. Results showing the extent of reduction in eggplant seedling stand caused by using Phomopsis-contaminated seed and by planting in Phomopsis-contaminated soil

Condition of		Percentage of seedling stand		
Seed	Soil	Test 1 *	Test 2	Mean
Disease-free	Sterile	28.2	72.4	50.3
Phomopsis-contaminated	Sterile	24.8	54.4	39.6
Disease-free	Phomopsis-contaminated	14.4	46.6	30.5
Phomopsis-contaminated	Phomopsis-contaminated	13.6	42.0	27.8

* Extremely small stand of test attributed to poor germination caused by low temperature prevailing from time of planting to time of stand count.

SUMMARY. Twenty-two percent of the eggplant seed lots examined showed presence of Phomopsis vexans spores, thus disclosing a selection, oftentimes, of poor, diseased fruit for seed extraction purposes.

Phomopsis-contaminated seed reduced stand 10.7%, Phomopsis-contaminated soil 19.8%, and the two together 22.5%, indicating the importance of obtaining disease-free seed and planting in disease-free seed beds.

LITERATURE CITED

1. Edgerton, C. W. and C. C. Moreland. Eggplant blight. Louisiana Agr. Exp. Sta. Bull. 178. Jan. 1921.
2. Nolla, J. A. B. The eggplant blight and fruit rot in Puerto Rico. Jour. Dept. Agr. of Puerto Rico. 35-37. 1929.
3. Palo, M. A. The Phomopsis disease of eggplant and its control. Philipp. Jour. Agr. 289-315. 1936.
4. Sherbakoff, C. D. Report of the Associate Plant Pathologist. Florida Agr. Exp. Sta. Ann. Rept. 1916. 80-98.

(VIRGINIA TRUCK EXPERIMENT STATION, NORFOLK).

DISEASE CONTROL WITH FERMATE AND SPERGON

John T. Middleton

At the present time there is considerable interest in materials which may be used as fungicides to replace copper-containing preparations. Fermate (ferric-dimethyl-dithio-carbamate) and Spergon (tetra-chloro-para-benzoquinone) have received extensive consideration. The reports of Anderson (PDR 26: 201-202) and Kincaid (PDR 26: 223) are of particular interest in that they report satisfactory control of tobacco downy mildew, a disease generally considered difficult to alleviate.

Control programs were established for onion downy mildew, caused by Peronospora destructor, belladonna (Atropa belladonna) downy mildew, caused by Peronospora sp. (? hyoscyami), and tomato late blight, caused by Phytophthora infestans; work on control of cantaloup powdery mildew, caused by Erysiphe cichoracearum, was done in the spring and summer of 1942 in Brawley and Riverside, California. Preliminary trials were conducted in glasshouses in the cases of belladonna and tomato; field trials were conducted with each of the four diseases.

Onion downy mildew:--Last fall this disease caused considerable damage to the onion seed crop in southern California; damage was also observed on the leek seed crop. In one district in Riverside County 25 acres were a total loss, with no seed harvested; an estimated 50% harvest was made on a 60-acre tract. This season (winter-spring) weekly applications of Spergon regular, 1.5 lbs. per 100 gals. water plus sufficient Grasselli sticker and spreader to give adequate coverage, were applied to Spanish sweet onions. Fermate was applied at the same concentration and with the same wetting agent. To date the disease has been adequately controlled by each material, infection varying from 3 to 7% in the treated plots

and 70 to 85% in the untreated plots.

Belladonna downy mildew:--A previous report has been presented (PDR 25: 513-514) in which it was shown that this disease could be controlled by applications of 0.5% lime sulfur and 6 oz. of emulsifier B-1956 per 100 gals. water. This same material was incorporated in the present tests using Spergon and Fermate at the rate of 1.5 lbs. per 100 gals. water with 6 oz. of B-1956. All 3 materials controlled the disease.

Tomato late blight:--Tests were conducted on nursery stock in seed frames. Spergon and Fermate were used at the same rate as given above, 1.5 lbs. per 100 gals. water with 6 oz. B-1956. Although both materials gave some measurable control, Spergon was found to be superior to Fermate. Brown rot of lemons, a disease caused by Phytophthora citrophthora, a fungus very similar to P. infestans, can be perfectly controlled by Spergon but not by Fermate. Klotz and the writer (Citrus Leaves 23 (3): 11-13, 1943) found that Spergon is effective at 0.25 lb. per 100 gals. water, whereas Fermate at 1.5 lbs. per 100 gals. water was not appreciably effective. Spergon seems to possess a specific toxicity for Phytophthora.

Cantaloup powdery mildew:--Spergon gives excellent control of this disease; results from this material indicate that it is equally as good as the best copper sprays now commercially employed. Spergon may be used satisfactorily at 0.75 lb. per 100 gals. water, provided the plants are thoroughly wetted and coverage is complete. Preliminary work with Fermate indicates adequate disease control when the material is applied at 1.5 lbs. per 100 gals. water with a suitable wetting agent.
(DIVISION OF PLANT PATHOLOGY, UNIVERSITY OF CALIFORNIA, RIVERSIDE).

TESTS WITH SOME VEGETABLE SEED PROTECTANTS

B. H. Davis and C. M. Haenseler

Experiments were conducted at the New Jersey Agricultural Experiment Station to test the value of some of the newer seed protectants in controlling seed decay and damping-off on 10 vegetable crops.

The seed protectants used were Spergon (tetrachloro-para-benzoquinone), Thiosan (DuBay 1205FF, tetramethyl-thiuramdisulfide), and Tuads (tetramethyl-thiuramdisulfide). Proliferol at the rate of 0.5% was included in the first experiments but since it proved to be of little value as a seed protectant, it was not included in later experiments. In each case one or more of the standard seed protectants for the crop in question was included as well as untreated controls. Thus in addition to the above materials, Semesan was included on all crops except one experiment on lima beans, and red copper oxide on beets, lettuce, and spinach, and on lima beans in one experiment. The vegetables, varieties, and dosages of materials used are given in Table 1.

The seeds were placed in an Erlenmeyer flask and the proper amount of protectant added. Shaking and rotating the flask for 15 minutes insured

Table 1. Vegetable seeds treated and dosage of protectants

Vegetable and Variety	Dosage				
	Semesan	Red Copper Oxide	Spergon	Thiosan	Tuads
	%	%	%	%	%
Beans:--Bountiful	.21		.125	.125	.125
Lima Beans:--Henderson Dwarf	.21	.125	.125	.125	.125
Beets:--Detroit Red Globe	1.25	1.5	.25	.25	.25
Cabbage:--Copenhagen Market	.42		.25	.25	.25
Cucumbers:--Early Fortune	.33		.25	.25	.25
Lettuce:--New York No.12	.21	2.0	.25	.25	.25
Peas:--Thomas Laxton	.33		.125	.125	.125
Peppers:--California Wonder	.42		.25	.25	.25
Radish:--Scarlet Globe	.42		.25	.25	.25
Spinach:--Virginia Blight Resistant	.33	2.0	.25	.25	.25

uniform coverage. Seeds were planted in composted soil either in flats or greenhouse benches or in sassafras loam soil in the field. Three experiments were conducted with each vegetable and each treatment was replicated 5 times with 100 seeds in each replication. The number of seedlings emerging was recorded and the data treated statistically (Table 2).

Summary of Results: In the tests here reported both Thiosan and Tuads gave good protection on most of the seed types used and gave no evidence of injury in any case. They were not as effective as red copper oxide for beets and spinach. In general, Thiosan and Tuads seemed to give effective seed protection on the same vegetable seed as did the organic mercury.

The results with Spergon varied considerably depending on the kind of seed used. No increase in germination was recorded on beets treated with Spergon and on spinach a significant increase in emergence was obtained in only 1 out of 3 tests conducted. On beans, lima beans, and peas our results show Spergon to be approximately equal to the other products tested, and showed no seedling injury in any case.

Table 2. Seedling emergence of 10 vegetable crops in relation to seed treatment; 3 experiments with each vegetable; all treatments replicated 5 times with 100 seeds in each replication

Vegetable	Planted in [a]	Seedling emergence with								"F" value necessary for significance	Calculated "F" value	Difference required for significance [b]
		Semesan	Red copper oxide	Spergon	Thiosan	Tuads	Proliferol	Check				
		%	%	%	%	%	%	%				%
Beans	F	92.8		91.0	93.0	89.8	93.0	91.6		2.71	1.21	N.S. [c]
	F	75.0		73.8	75.8	80.6		67.0		3.01	3.15	8.3
	GB	88.6		77.4	76.6	84.8		51.8		3.01	18.33	4.8
Lima Beans	F	55.6		80.2	82.8	85.2		79.6		3.01	2.23	N.S.
	F	86.0		84.4	82.4	85.0		79.6		3.01	1.3	N.S.
	F		60.4	69.8	63.6	72.2		50.6		3.01	8.38	8.5
Beets	GF	117.4	124.4	107.0	115.0	130.2	112.4	96.6		2.51	5.81	13.4
	GB	82.6	134.6	59.4	118.4	115.2		86.2		2.71	23.79	16.9
	GB	89.2	110.6	9.4	60.0	90.6		21.8		2.71	4.35	18.2
Cabbage	GB	76.4		61.2	56.2	69.8		36.6		3.01	27.75	8.7
	GB	72.8		62.8	52.6	72.8		36.8		3.01	26.7	8.9
	GB	80.4		79.2	78.4	81.0		73.4		3.01	1.75	N.S.
Cucumbers	GB	79.2		87.0	84.8	84.8	33.8	33.0		2.71	57.73	10.3
	GB	79.0		78.0	79.6	81.8	48.6	55.8		2.71	24.1	8.6
	GB	73.0		64.0	67.2	66.4		39.6		3.01	28.78	7.3
Lettuce	GF	61.8	39.4	56.0	60.6	46.8	58.8	66.4		2.51	1.22	N.S.
	GF	44.0	60.4	46.6	52.4	47.6	47.8	54.0		2.51	1.06	N.S.
	GB	65.6	71.8	60.4	60.0	55.0	55.4	57.4		2.51	5.69	7.4
Peas	GB	91.2		92.8	89.8	91.8	83.2	87.4		2.71	3.97	5.4
	F	92.8		91.4	93.6	91.8	92.6	93.0		2.71	.43	N.S.
	F	88.2		77.8	78.0	80.8		42.0		3.01	80.4	6.0

Table 2. cont.

Vegetable	Planted in [a]	Seedling emergence with: Semesan	Red copper oxide	Spergon	Thiosan	Tuads	Proliferol	Check	"F" value necessary for significance	Calculated "F" value	Difference required for significance [b]
		%	%	%	%	%	%	%			%
Peppers [d]	GB	92.8		88.6	92.6	96.6	91.2	88.6	2.71	10.47	2.8
	GB	79.2		72.4	72.0	75.6		77.4	3.01	.78	N.S.
Radish	GB	72.0		58.2	78.2	71.0		51.4	3.01	3.96	5.5
	GB	78.4		69.4	76.8	73.2		67.0	3.01	5.4	6.3
	GB	73.4		61.2	73.2	74.8		52.6	3.01	12.43	8.3
Spinach	GB	71.2	68.2	43.4	60.2	57.0		39.0	2.71	12.7	10.8
	GB	39.8	42.4	17.0	43.0	45.2		25.8	2.71	3.65	5.6
	GB	70.8	68.8	46.6	65.2	62.4		37.2	2.71	43.33	6.2

[a] F = field; GF = greenhouse flat; GB = greenhouse bench.

[b] Difference required for significance at 5%.

[c] Not significant.

[d] Plants in experiment 2 destroyed by rodents, no counts made.

(NEW JERSEY AGRICULTURAL EXPERIMENT STATION).

BRIEF NOTES ON PLANT DISEASES

APPLE SCAB DEVELOPMENT IN ILLINOIS: The first mature ascospores of Venturia inaequalis were found at Urbana on February 18. Two asci in one perithecium out of 30 examined showed brown spores on this date. Most of the asci were about half-grown and only a few showed the cutting out of spores. In early March collections from various sections of the State showed a few mature spores. On March 15 collections at Urbana showed that about 80% of the perithecia contained mature ascospores. In many cases from 50 to 90% of the asci in the perithecia showed brown ascospores which discharged quickly on crushing.

Perithecia are abundant in most orchards but were difficult to find in a few well-sprayed orchards.

Attention is again called to the fact that observations over a series of years have proved that abundant mature ascospores are to be found in early March, several weeks before the opening of the buds under Illinois conditions, and heavy discharge may occur before there is any green tissue exposed. Nevertheless, there seems to be plenty of spores left after these premature discharges to bring about a heavy infection. (March 18)--(H. W. Anderson, Department of Horticulture, University of Illinois, Urbana, Illinois).

TOBACCO BLUE MOLD IN GEORGIA: Georgia is experiencing the most critical shortage of tobacco plants since 1932. The cause is again the same, a combination of blue mold [downy mildew, Peronospora tabacina] and freezes. Blue mold was still active April 1, and it had been active since early February. Owing to lack of disease and to the generally favorable plant growing conditions of the past 3 years, very few growers used blue mold control measures this year. The combination of disease and cold has destroyed at least 80% of the Georgia plants. So few plants remain that only under the most favorable transplanting conditions will it be possible to set the acreage allotted. At best the crop will go in from 2 to 6 weeks late. The very severe blue mold epidemic has provided a critical test of control measures, and the results with the new organic sprays are of particular interest. Satisfactory blue mold control was secured with regular Copper oxide-oil, Bismuth salicylate-Vatsol, and Benzyl salicylate-oil, with good residual protection. Fermate 2 lbs., Thiosan 4 lbs., and Spergon 4 lbs. -- all to 100 gals. -- gave excellent early protection against blue mold, but about the time plants were of a size to set out, these plots all came down with a moderate to severe mold attack which, however, did not kill the plants because of their size. It is thought probable that these last treatments would give successful blue mold control under the less severe disease conditions that prevail in most areas. (J. G. Gaines and E. E. Clayton, Cooperative Investigations, Georgia Coastal Plain Experiment Station and Bureau of Plant Industry, Soils, and Agricultural Engineering).

CHECK LIST REVISION

Freeman Weiss

AGROSTIS (GRAMINEAE)

AGROSTIS ALBA L., REDTOP. Of Eurasian origin but long cult. for forage and turf and widely escaped throughout the cooler parts of the U. S.

Ascochyta graminicola Sacc., on leaves. N. Y.
Cercospora graminis (Fckl.) Horsfall. See Scolecotrichum graminis.
Claviceps microcephala (Wallr.) Tul., ergot. Md., Mich., Ohio.
C. purpurea (Fr.) Tul., ergot. Mich., Minn., N. Dak., Oreg., Pa.
Colletotrichum graminicolum (Ces.) G. Wils., anthracnose. Ill., Iowa, Md., Ohio, Pa.
Corticium solani (Prill. & Del.) Bourd. & Galz. See Rhizoctonia solani.
Cylindrosporium glyceriae Ell. & Ev. var., leaf spot. N. Y.
Didymella agrostidis Dearn. & House, on dead culms. N. Y.
Entyloma crastophilum Sacc., leaf smut. Wis.
Erysiphe graminis DC., powdery mildew. Iowa, Minn.
Fusarium nivale (Fr.) Ces., snow mold. Oreg. Conidial stage of Calonectria graminicola (Berk. & Br.) Wr.
Helminthosporium dematioideum Bub. & Krobl., on leaves. Conn., N. Y.
H. erythrospilum Drechsl., leaf spot. Conn. to Va., Ind. & Mis.
H. stenacrum Drechsl., on leaves. Iowa, Md., N. Car.
H. triseptatum Drechsl., leaf spot. N. Y.
Leptosphaeria sp., on culms & basal leaves. Pa.
Macrophoma spartiicola Berl. & Vogl., on dead culms. Mich.
Marasmius tritici P. A. Young, collar rot. Ill.
Mastigosporium rubricosum Dearn. & Barth., red eye-spot. Oreg., Wyo.
Mycosphaerella tassiana (de Not.) Johans., on dead culms.
Ovularia sp., leaf spot. Pa.
O. pulchella (Ces.) Sacc., leaf spot. Oreg., Utah.
Passalora graminis (Fckl.) Höhn. See Scolecotrichum g.
Phyllachora graminis (Pers. ex Fr.) Fckl., black spot. N. Y.
Placosphaeria graminis Sacc. & Roum., leaf spot. Va.
Puccinia coronata Cda. (II, III), crown rust. Fla., Ga., Ky., La., Oreg.
P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Mont.
P. graminis Pers. (II, III), stem rust. Widespread. All tested collections belong to the var. agrostidis Eriks.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. N. Y., Tenn., Va. The var. impatientis (Arth.) Mains with O and I on Impatiens spp. has been confirmed.
Pythium debaryanum Hesse and P. ultimum Trow., root necrosis. N.Dak.

AGROSTIS ALBA cont.

Ramularia graminicola Pk., on leaves. Wis.
Rhizoctonia solani Kühn, brown patch, root & leaf rot. N. Dak., Oreg. Sterile stage of Corticium solani (Prill. & Del.) Bourd. & Galz. (C. vagum Berk. & Curt. var. solani Burt), usually found in this stage.
Rhynchosporium orthosporum Caldwell and R. secalis (Oud.) Davis, scald, leaf blotch. Oreg.
Sclerotium rhizodes Auers., white tip blight. Conn., Mass., Pa., Wis.
Scolecotrichum graminis Fckl., brown stripe. Widespread. (= Passalora graminis (Fckl.) Höhn. and Cercospora graminis (Fckl.) Horsfall).
Septogloeum oxysporum Sacc., Bomm. & Rous., char spot. Wyo.
Septoria triseti Speg., gray leaf speckle. Oreg.
Uromyces jacksonii Arth. & Fromme (II, III), rust. Oreg.
Urocystis agropyri (Preuss.) Schroet., flag smut. Wis.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Widespread.

AGROSTIS CANINA L., VELVET BENTGRASS. Native of Europe, possibly also of eastern N. America, grown for fine turf in the Northeastern States.

Ascochyta graminicola Sacc., on leaves. Mass.
Curvularia lunata (Wakker) Boed., on leaves. Va.
Helminthosporium giganteum Heald & Wolf, zonate eye spot. Md.
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eye-spot. Oreg.
Puccinia coronata Cda. (II, III), crown rust. Oreg.
P. graminis Pers. (II, III), stem rust. Oreg. The vars. agrostidis Eriks. and tritici Eriks. & Henn. have been confirmed.
Rhizoctonia solani Kühn, brown patch. Widespread.
Sclerotinia homoeocarpa Bennett, dollar patch. Mass., R. I. (Only the sterile stage (Sclerotium sp.) has been found in the U. S.)
Tilletia pallida G. W. Fisch., head smut. N. J.
Typhula itoana Imai, snow mold. Mass.

AGROSTIS DIEGOENSIS Vasey, THINGRASS (1). Native meadow grass of Pacific Coast States to W. Montana, of some value as forage. Also the similar grasses of coastal habitats A. PALLENS Trin., DUNE BENTGRASS (2), and A. HALLII Vasey, HALL'S B. (3).

Dothidella aristidae (Schw.) Ell. & Ev., on stems. Oreg.
Erysiphe graminis DC., powdery mildew. Calif.
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Oreg.
Puccinia coronata Cda. (II, III), crown rust. Oreg.
P. graminis Pers. var. agrostidis Eriks., stem rust. Calif. (+ 3).

AGROSTIS DIOEGOENSIS cont.
Rhizoctonia solani Kühn, leaf rot. Oreg. (3).
Scolecotrichum graminis Fckl., brown stripe. Oreg. (3).
Selenophoma donacis (Pass.) Sprague & A. G. Johns., var., stem-speckle. Calif.
Septogloeum oxysporum Sacc., Bomm. & Rous., char spot. Oreg. (3).
Septoria calamagrostidis (Lib.) Sacc., leaf spot. Oreg.
Uromyces jacksonii Arth. & Fromme (II, III), rust. Calif. (+2), Oreg. (+2 & 3).

AGROSTIS EXARATA Trin., SPIKE BENTGRASS. Native grass of the Western States, valuable for forage.
Claviceps purpurea (Fr.) Tul., ergot. Oreg.
Erysiphe graminis DC., powdery mildew. Alaska to Calif., Idaho, Mont.
Helminthosporium triseptatum Drechsl., leaf spot. Oreg.
Hendersonia sp., leaf spot & rot. Oreg.
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eye-spot. Oreg.
Puccinia coronata Cda. (II, III), crown rust. Calif., Oreg., Wash.
P. graminis Pers. (II, III), stem rust. Calif., Idaho, Mont., Nebr., Oreg. The var. avenae Eriks. & Henn. has been confirmed.
P. liatridis [Webber] Bethel (II, III), rust. Colo.
Scolecotrichum graminis Fckl., brown stripe. Idaho, Oreg.
Septoria calamagrostidis (Lib.) Sacc., leaf spot. Oreg.
S. grylli Sacc. Alaska.
S. triseti Speg., gray leaf speckle. Oreg. On var. ampla Hitchc.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Oreg., Utah.

AGROSTIS SCABRA Willd., WINTER BENTGRASS (1). Native meadow grass distributed throughout N. America. Also A. PERENNANS (Walt.) Tuckerm., AUTUMN B. (2), occurring in the Eastern and Southern States to the Great Plains.

Claviceps purpurea (Fr.) Tul., ergot. N. Dak., Okla., Wis.
Epichloë typhina (Pers. ex Fr.) Tul., choke. Va. (2).
Helminthosporium dematioideum Bub. & Wröbl., on leaves. Conn., N. Y.
H. erythrospilum Drechsl., leaf spot. Conn., N. Y.
Mycosphaerella sp., on stems. Alaska.
Puccinia graminis Pers. (II, III), stem rust. Widespread. Only the var. agrostidis Eriks. has been collected in nature.
P. liatridis [Webber] Bethel (II, III), rust. Colo., N. Mex.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Widespread. Var. impatientis (Arth.) Mains.
Sclerotium rhizodes Auers., leaf blight. Wis.
Scolecotrichum graminis Fckl., brown stripe. Calif., Oreg., S. Dak.

AGROSTIS SCABRA cont.

Selenophoma donacis (Pass.) Sprague & A. G. Johns. var., stem speckle. N. Dak.
Septogloeum oxysporum Sacc., Bomm. & Rous., char spot. Oreg.
Septoria grylli Sacc., leaf spot. Alaska.
S. secalis Prill. & Del. var. stipae Sprague, leaf spot. N. Dak.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Pa.

AGROSTIS PALUSTRIS Huds., CREEPING BENTGRASS (1). Low grass of moist habitats, probably of European origin but established in the Northeastern States and on the Pacific Coast, occasionally inland; used for fine turf as Metropolitan, Seaside, and Washington b. Also A. STOLONIFERA L. (2), a native grass of northern N. America.

Cladochytrium graminis Büsgen, associated with damping off and brown patch. Conn. (+2).
Claviceps purpurea (Fr.) Tul., ergot. Oreg.
Curvularia lunata (Wakker) Boed., on leaves. Va.
Fusarium culmorum (W. G. Sm.) Sacc., root rot. Oreg.
F. nivale (Fr.) Ces., and var. majus Wr., snow mold. Mich., Oreg., Wash.
Helminthosporium giganteum Heald & Wolf, zonate eye spot. Conn. to Va. (+2). Tex. Chiefly on the Virginia strain.
H. stenacrum Drechsl., on leaves. Conn. (2).
Macrophoma sp., leaf spot. Oreg.
Mastigosporium rubricosum (Dearn. & Barth.) Sprague, red eye-spot. Oreg. (+2).
Ovularia pulchella (Ces.) Sacc., tan leaf spot. Oreg.
Phaeoseptoria sp., leaf spot. Oreg.
Piricularia grisea (Cke.) Sacc., leaf blight. Texas (2).
Puccinia coronata Cda. (II, III), crown rust. Oreg.
P. graminis Pers. (II, III), stem rust. Calif., Pa.
Var. agrostidis Eriks.
Rhizoctonia solani Kühn, brown patch. Northeastern and N. Central States, Oreg. (+2). Tex. Some strains, as Metropolitan and Washington, are resistant.
Sclerotium sp. (? Sclerotinia homoeocarpa Bennett), dollar patch. Minn.
Septoria calamagrostidis(Lib.) Sacc., leaf spot. Oreg.
S. triseti Speg., gray leaf speckle. Oreg.
Tilletia pallida G. W. Fisch., head smut. Oreg.
Typhula itoana Imai, snow mold. Minn., N. J.
Uromyces jacksonii Arth. & Fromme (II, III), rust. Oreg.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Mass., Oreg., Pa., Wash. (2).

AGROSTIS TENUIS Sibth., COLONIAL BENTGRASS. Turf grass probably of European origin but long cult. for pasture and lawns, and established in the Northeastern States and north Pacific coast region.

Claviceps purpurea (Fr.) Tul., ergot. Oreg.
Ditylenchus graminophila (Goodey) Filip., leaf nematode. Oreg.
Entyloma crastophilum Sacc., leaf smut. Wis.
Fusarium culmorum (W. G. Sm.) Sacc., root rot. Oreg.
F. nivale (Fr.) Ces., snow mold. Oreg.
Helminthosporium stenacrum Drechsl., leaf blight. Oreg.
Hastigosporium rubricosum (Dearn. & Barth.) Sprague, red eye-spot. Oreg., Wash.
Ovularia pulchella (Ces.) Sacc., leaf spot. Utah.
Puccinia coronata Cda. (II, III), crown rust. Oreg.
P. graminis Pers. (II, III), stem rust. Northern U. S., Mass. to Iowa and Oreg. Var. agrostidis Eriks.
Rhizoctonia solani Kühn, brown patch. Widespread.
Robillardia agrostidis Sprague, leaf rot. Oreg.
Scolecotrichum graminis Fckl., brown stripe. Ind.
Septoria triseti Speg., gray leaf speckle. Oreg., Wash.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Conn. to Mo. & Iowa, Oreg. & Wash.

ALOPECURUS (GRAMINEAE)

ALOPECURUS AEQUALIS Sobol., SHORTAWN FOXTAIL (1). Meadow grass of Eurasia, distributed throughout the northern U. S., especially range lands of high altitude in the West; of some forage value. Also A. GENICULATUS L., WATER FOXTAIL (2) of similar range, in moist habitats.

Claviceps purpurea (Fr.) Tul., ergot. N. Dak.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Minn.
Entyloma speciosum Schroet. & P. Henn., leaf smut. Tex.
Epichloë typhina (Pers. ex Fr.) Tul., choke. Mich.
Puccinia coronata Cda. (II, III), crown rust. Ind.
P. graminis Pers. (II, III), stem rust. Calif., Ind., Minn., N. Dak., Wis. Susceptible to the vars. agrostidis, avenae, and phlei-pratensis.
P. poae-sudeticae (Westend.) Jørstad (II, III), rust. Ind., Nebr., Utah.
Scolecotrichum graminis Fckl., brown stripe. Widespread.
Uromyces alopecuri Seym. (II, III), leaf rust. Colo., Iowa, Minn., Nebr., Wyo.

ALOPECURUS PRATENSIS L., MEADOW FOXTAIL. Meadow grass of Eurasia occurring chiefly in the Northeast and N. Central States, sometimes cult. for forage.

ALOPECURUS PRATENSIS cont.
Claviceps purpurea (Fr.) Tul., ergot. Mich., Mont., Oreg.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Minn.
Helminthosporium sp., leaf spot. N. Dak.
Puccinia coronata Cda. (II, III), crown rust. Oreg.
P. graminis Pers. (II, III), stem rust. Minn., Oreg., S. Dak., Wash. Vars. agrostidis Eriks. and avenae Eriks. & Henn.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Mass.
Var. agropyrina (Eriks.) Arth.
Rhynchosporium orthosporum Caldwell, scald. Oreg.
Sclerospora graminicola (Sacc.) Schroet., downy mildew. Miss.
Scolecotrichum graminis Fckl., brown stripe. Ind., N. Dak., Oreg.

AMMOPHILA (GRAMINEAE)

AMMOPHILA ARENARIA (L.) Link, EUROPEAN BEACHGRASS and A. BREVILIGULATA Fernald, AMERICAN B. Grasses inhabiting sand dunes, the former introduced for erosion control on the Pacific Coast, the latter occurring on the Atlantic Coast and shores of Great Lakes.

Camarosporium graminicolum Ell. & Ev., on dead culms. N. Y.
C. metableticum Trail, on leaves. Mass.
Cladosporium sp., leaf mold. Oreg.
Claviceps purpurea (Fr.) Tul., ergot. Ind., Mich., Ohio.
Fusicladium sp., leaf mold. Calif.
Helminthosporium sativum Pam., King & Bakke, root rot. N. Dak.
Phyllachora graminis (Pers. ex Fr.) Fckl. var., tar spot. Ala., Mass.
Puccinia ammophilina (Kleb.) Mains (II, III), rust. Mich., Oreg.
P. ampnigena Diet. (II, III), rust. Ind. C and I on Leucocrinum and Smilax.
P. coronata Cda. (II, III), crown rust. Mass., N. H.
P. graminis Pers. var. avenae Eriks. & Henn. (II, III), stem rust. Calif.
Pyrenopeziza ellisii Massee, on dead culms. (N. J.)
Pythium arrhenomanes Drechsl., root browning. N. Dak.
Tiarospora perforans (Rob.) Höhn., on leaves. Oreg.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Conn., Mass., Me.

ANDROPOGON (GRAMINEAE)

ANDROPOGON FURCATUS Muhl., BIG BLUESTEM (bluejoint turkeyfoot). Tall grass ranging from the Atlantic Coast to the Great Plains, a dominant element of the tall-grass prairie, of high forage value. Also A. HALLII Hack., SAND BLUESTEM (turkeyfoot), of the Western Prairies and Great Plains.

ANDROPOGON FURCATUS cont.

Ascochyta sp., leaf spot. N. Dak.
Asteroma graminis Westend., on culms. Kans., Mo.
Cerebella andropogonis Ces., blackhead. Ga., Kans., Okla., Tex.
(Though previously regarded as possibly parasitic on the grass inflorescence, the fungus is merely saprophytic on the Sphacelial stage of ergot and is an index of ergot infection.--R. F. Landon, Phytopath. 32: 613-617. 1942).
Claviceps purpurea (Fr.) Tul., ergot. Ga., Kans., Okla., Tex.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. N. Dak.
Dothichloë atramentosa (Berk. & Curt.) Atk., black crust, sterility disease. Miss.
Ellisiella caudata (Pk.) Sacc., on culms & leaves. Kans., Miss., N. Dak.
Epichloë typhina (Pers.) Tul., choke, cat-tail. Wis.
Fusarium scirpi var. acuminatum (Ell. & Ev.) Wr., secondary root rot. Nebr., N. Dak.
Leptosphaeria culmorum Auers., on dead culms. N. Dak.
Helminthosporium sp., leaf spot. Minn.
H. sativum Pam., King & Bakke, root rot. N. Dak.
Phyllachora graminis (Pers. ex Fr.) Fckl., black spot. Ill., S. Dak., Wis.
P. luteo-maculata (Schw.) Orton. Ill., Mich., N. Mex., N. Y., S. Dak.
Phyllosticta sp., leaf spot. N. Dak.
Puccinia andropogonis Schw. (II, III), leaf rust. General.
(O and I on various genera chiefly of Scrophulariaceae, and also Leguminosae, Oxalidaceae, Polygalaceae, Rutaceae and Santalaceae. Arthur recognizes 9 vars. based on aecial host and spore characteristics).
P. ellisiana Thüm. (II, III), leaf rust. N. Y. to Miss., Colo. and N. Dak. O and I on Viola spp.
P. tripsaci Diet. & Holw., leaf rust. Minn. & N. Dak. to Okla. & Colo. O and I on Ceanothus spp.

Pythium arrhenomanes Drechsl., root browning. N. Dak.
P. debaryanum Hesse and P. ultimum Trow, damping off. Nebr., N. Dak.
Septoria andropogonis Davis, leaf spot. Wis.
Sorosporium everhartii Ell. & Gall., kernel smut. Nebr.
S. provinciale (Ell. & Gall.) Clint., head smut. Ind., Mo., Nebr., Texas.
Sphacelotheca andropogonis (Cpiz) Bub., head smut. Kans., S. Dak., Tenn.
S. occidentalis (Seym.) Clint., kernel smut. N. Dak. to Ind., La. & Tex.
Stagonospora ischaemi Sacc., on dead culms. Ala.
Bends -- cause unknown. N. Dak.
Stomatal drowning -- watersoaking of leaves and bacterial invasion. N. Dak.

ANDROPOGON SACCHAROIDES Swartz, SILVER BLUESTEM or BEARDGRASS. Tall grass of the southern Mississippi Valley and Great Plains; of forage value in dry regions and sometimes grown for ornament. Also A. BARBINODIS Lag., CANE BLUESTEM or BEARDGRASS, occurring in drier areas west and south.

Claviceps purpurea (Fr.) Tul., ergot. Tex. With Cerebella andropogonis Ces.
Phyllachora graminis (Pers. ex Fr.) Fckl., black spot. Tex.
Puccinia andropogonis Schw. (II, III), leaf rust. General.
Sphacelotheca andropogoris (Opiz) Bub., head smut. Ariz., Tex.
S. andropogonis-hirtifolii (P. Henn.) Clint., head smut. Ariz.
Tolyposporella brunkii (Ell. & Gall.) Clint., leaf smut. Tex.

ANDROPOGON SCOPARIUS Michx., LITTLE BLUESTEM or BEARDGRASS. Tall grass of prairies and old fields, in the Central and Eastern States, extending to the Rocky Mts., valuable for forage in the Great Plains region.

Claviceps purpurea (Fr.) Tul., ergot. Kans. With Cerebella andropogonis Ces.
Didymosphaeria crastophila Niessl, on dead culms. N. Dak.
Dothichloë atramentosa (Berk. & Curt.) Atk., sterility disease. Kans., Mo., Va.
D. limitata Diehl. Mo., N. Car.
Ellisiella caudata (Pk.) Sacc., leaf spot. Kans.
Myriogenospora paspali Atk., fasciation. La., Texas.
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Va.
P. luteo-maculata (Schw.) Orton. Mass., Minn., Miss., Va.
Puccinia andropogonis Schw. (II, III), leaf rust. General.
P. ellisiana Thüm. (II, III), leaf rust. General.
P. kaernbachii (P. Henn.) Arth. (II, III), rust. Fla. On A. stolonifer (Nash) Hitchc.
Pythium debaryanum Hesse, root necrosis. N. Dak.
Sorosporium ellisii Wint., head smut. Conn. to Fla., Kans. & S. Dak.
S. everhartii Ell. & Gall., kernel smut. Ala., Conn., Md., N. J., N. Car., Va.
Sphacelotheca andropogonis (Opiz) Bub., head smut. Ill., Kans., N. Car., Va.
S. occidentalis (Seym.) Clint., kernel smut. Va.
Uromyces andropogonis Tracy (II, III), leaf rust. N. J., N. Car. O and I on Viola spp.
Stomatal drowning -- watersoaking of leaves and bacterial invasion. N. Dak.

ANDROPOGON VIRGINICUS L. BROOMSEDGE (1); also A. ELLIOTTII Chapm., ELLIOTT BEARDGRASS (2), and A. GLOMERATUS (Walt.) B. S. P., BUSHY B. (3). Tall grasses of old fields,

ANDROPOGON VIRGINICUS cont.

usually in moist areas, of the Atlantic Coastal Plain and southern Mississippi Valley; furnishing food for wildlife.

Claviceps purpurea (Fr.) Tul., ergot. Fla., Miss.
Dothichloë atramentosa (Berk. & Curt.) Atk., sterility disease. Ala., Va.
D. limitata Diehl. Fla., Ga., Tenn., Va.
Gnomonia andropogonis Ell. & Ev., on dead leaves. Miss., N. J.
Leptosphaeria subcompressa J. H. Miller & Burton, on dead culms, Ga.
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on culms. N. J.
Metasphaeria infuscans Ell. & Ev., on dead leaves. Ala., Miss.
Phyllachora graminis (Pers. ex Fr.) Fckl., black spot. Widespread.
(Several names based on Sphaeria andropogi Schw. (sterile) and S. andropogicola Schw. (immature) have been applied to the form of this sp. on Andropogon. Of these P. andropogonis Karst. & Hariot has priority but its identity with American specimens lacks confirmation; it therefore seems best to use the general name though the sp. may be distinct. Confusion with the following sp. has also occurred).
P. luteo-maculata (Schw.) Orton. La., Tex.
Piricularia grisea (Cke.) Sacc., leaf spot. Tex. (3).
Puccinia andropogonis Schw. (II, III), leaf rust. Widespread.
P. ellisiana Thüm. (II, III), leaf rust. Md., N. J., Tenn., Va.
Ramularia andropogonis (Cke.) Wr., on dead culms. N. J.
Sorosporium ellisii Wint., head smut. Ala., Ark., Ind., La., Miss., N. J., N. Car., Va.
S. everhartii Ell. & Gall., kernel smut. N. J. to Fla. & La.
Sphacelotheca occidentalis (Seym.) Clint., kernel smut. Calif. (3).
S. seymouriana Clint., kernel smut. Ala., Ga., N. Car.
Uromyces andropogonis Tracy (II, III), leaf rust. N. Y. to Fla., La. & Mo.
Ustilago striaeformis (Westend.) Niessl, stripe smut. Ohio.

ANTHOXANTHUM (GRAMINEAE)

ANTHOXANTHUM ODORATUM L., SWEET VERNALGRASS. Meadow grass of Eurasia, grown in hay mixtures for fragrance and also naturalized in the Eastern States and Pacific Northwest. Available records on A. ARISTATUM Boiss., similar in range and habit, but annual, are included.

Cladosporium herbarum Lk., leaf mold. Oreg.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Oreg., Pa.
Helminthosporium dematioideum Bub. & Wrobl., leaf spot. Md., N. Y., Oreg.
Phyllosticta anthoxella Sprague, leaf spot. Oreg.
Puccinia graminis Pers. (II, III), stem rust. Del., Me., N. J., N. Y.
Var. avenae Eriks. & Henn.

ANTHOXANTHUM ODORATUM cont.

Puccinia poae-sudeticae (Westend.) Jørst. (II), leaf rust. Me.

Tilletia anthoxanthi Blytt, kernel smut. Conn., Pa.

ARISTIDA (GRAMINEAE)

ARISTIDA spp., THREE-AWN. Several spp. of native grasses occurring chiefly in dry, open ground throughout the U. S.; of limited forage value in the Southwest, especially A. ADSCENSIONIS L., A. ARIZONICA Vasey, A. LONGISETA Steud., and A. ORCUTTIANA Vasey.

Dothichloë aristidae Atk., black crust, sterility disease. Ala., Fla., Ga., Miss., Tex., Va.

D. atramentosa (Berk. & Curt.) Atk. Fla., Tex.

D. hemicrypta Diehl. Tex.

Euryachora aristidae (Schw.) Theiss. & Syd., tar spot. Ga., Md., Miss., N. Car., P. R., N. J.

Hendersonia effusa Berk. & Curt. Ala.

Puccinia aristidae Tracy (II, III), rust. Calif., Idaho, Md., Nebr., N. Mex., Tex. O and I on numerous dicotyledonous seed plants.

Selenophoma donacis (Pass.) Sprague & A. G. Johns., stem-speckle. Iowa, N. Dak.

Sorosporium consanguineum Ell. & Ev., kernel smut. S. Dak. to Idaho, Texas and Ariz.

S. confusum Jacks., head smut. Ala., Del., Md. On A. dichotoma Michx. and A. purpurascens Poir.

S. ellisii Wint., head smut. Calif., Ohio, Pa. On A. dichotoma.

Tilletia oklahomae Zundel, kernel smut. Okla. On A. longespica Poir.

Uromyces aristidae Ell. & Ev. (II, III), rust. Ariz., N. Mex., Tenn.

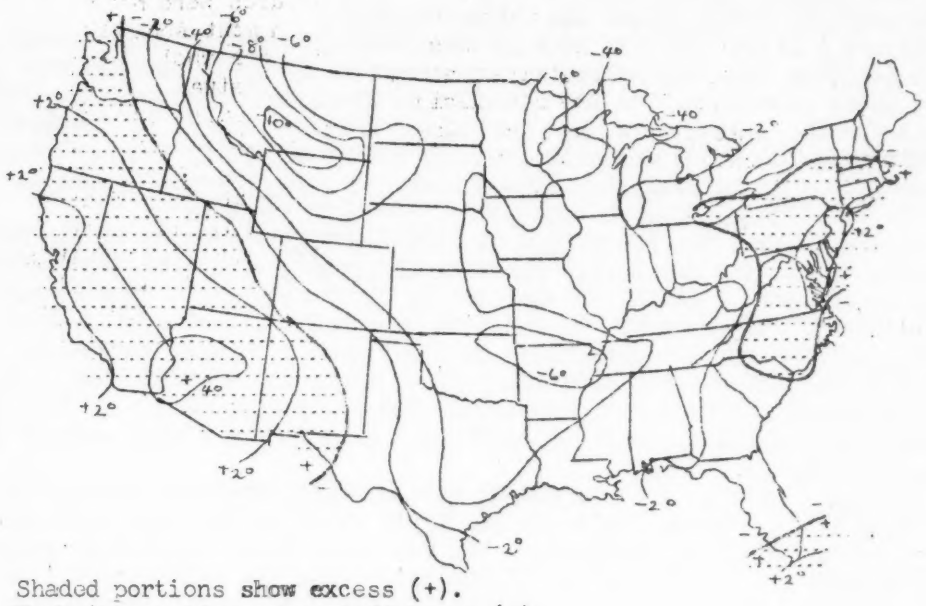
U. peckianus Farl. (II, III), rust. Widespread. O and I on various dicotyledons.

(DIVISION OF MYCOLOGY AND DISEASE SURVEY).

MARCH WEATHER

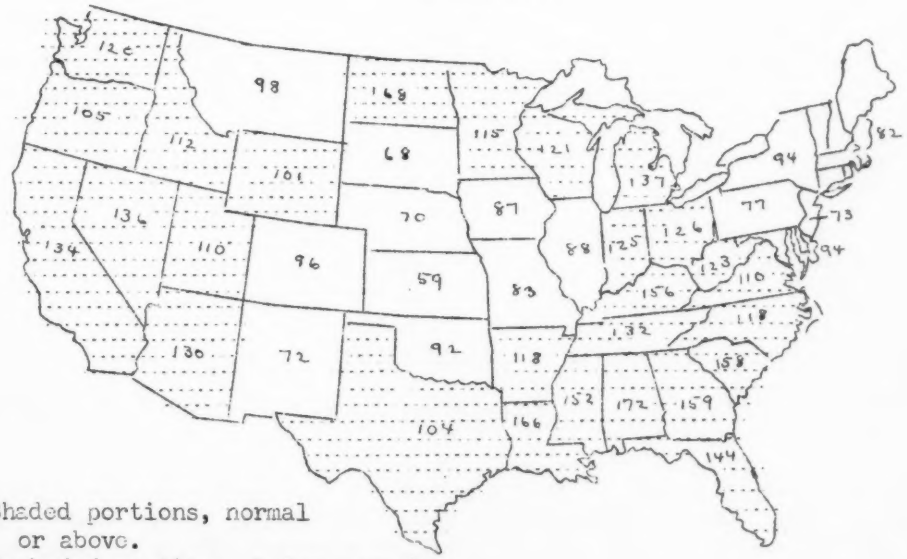
(From U. S. Department of Commerce, Weekly Weather and Crop Bulletin for weeks ending April 6 and 13, 1943).

The weather of March was characterized by unusually pronounced, short-period successions of unseasonably cold and abnormally warm weather, the former dominating in most sections of the country. Precipitation was unusually heavy in the South, except the Southwest, and was above normal rather generally from the Ohio River eastward and northeastward, except in parts of the Northeast. Also, much of the western Lake region and most



Shaded portions show excess (+).
Unshaded portions show deficiency (-).
Lines show amount of excess or deficiency.

Fig. 1. Departure of Mean Temperature from Normal, March 1943



Shaded portions, normal or above.
Unshaded portions, below normal.
Lines show percentage of normal.

Fig. 2. Percentage of Normal Precipitation by States, March 1943

of the Pacific coast had above-normal precipitation. On the other hand, the southern Great Plains was decidedly dry.

Figure 1 shows that the monthly mean temperatures were near normal in the Atlantic area and moderately above normal in most sections west of the Rocky Mountains. On the other hand, March as a whole was decidedly cold for the season from the Mississippi Valley westward to the Rocky Mountains, the minus anomalies ranging rather generally from 4° to 10°. East of the Rocky Mountains, March last year was abnormally warm in the north and slightly colder than normal in Gulf sections.

Figure 2 shows the percentage of normal precipitation by States for March. Following the driest February of record, with only three States having as much as normal precipitation, March was much wetter in many sections of the country. The western Lake region, most of the Ohio Valley, and a large southeastern area had much more than normal for the month, the latter being especially wet. Also, the monthly totals were above normal rather generally west of the Rocky Mountains. On the other hand, most of the Plain States continued dry, Kansas having only 59 percent of normal.

The March average for the entire United States was 2.78 inches, or 2 percent above normal. This was the first month so far this year with as much as normal precipitation. So far there have been rather large deficiencies in precipitation in the Northeast, the Ohio Valley, and in the States between the Mississippi River and Rocky Mountains, except the extreme north. Some interior sections had but little more than half the normal for the first months, with the nation-wide average 88 percent of normal.